

## **Cattle extension programs and research for tropical agriculture**

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### **INTRODUCTION**

Successful Extension programs must be useful and practical in order for participants to gain information that can be readily adopted. Seaman Knapp, one of Extension's most influential pioneers in the USA stated, "What a man hears, he may doubt. What he sees, he may possibly doubt. But what he does himself, he cannot doubt (Seevers et al., 1997)."

Indonesian agriculture has come a long way over the past decade. However, subsistence agriculture is still prevalent and there is much that can be done to increase productivity and economic viability. The challenge is to develop extension programs that are timely and relevant. Cooperation from all sides of agriculture will make this possible. This would include collaboration with private industry, federal and provincial government's right down to the grass roots producers themselves. There must be a commitment particularly from the government agencies to devote the resources necessary to develop programs and be a presence in the rural areas of Indonesia.

We know there is a common framework of successful agricultural extension based on five principles (Killough):

1. A sound agricultural policy is indispensable
2. Extension consists of "facilitation" as much if not more than "technology transfer"
3. Producers are clients, sponsors and stakeholders, rather than beneficiaries of agricultural extension
4. Market demands create an impetus for a new relationship between farmers and private suppliers of goods and services
5. New perspectives are needed regarding public funding and private sectors

However, the environment of agricultural extension is changing in the following ways:

1. The aims of official development assistance are becoming more focused. This means reducing poverty and social inequalities, the sustainable use of natural resources, and participatory development, are overall objectives to which extension policies can make a significant contribution. People are leaving the country for the cities but at the same time the rural population is expanding rapidly and has limited access to health and education services.

Food security is often a problem for the rural poor, a large proportion of whom live only by agriculture. Food security in towns and the sustainable management of natural resources hinges on farmers' work. By helping to improve farming and farm yields, agricultural extension can be a very powerful tool for empowerment and support to community livelihoods. These objectives highlight the fact that extension systems must be accessible and useful to the poorest, and address the special concerns of women farmers and young farmers.

2. Changes are happening in Indonesia as there is increased economic liberalization, decentralization and privatization. The standard of living has been slow to increase but there is in fact a trend forward. This is resulting in urban families having more disposable income which trickles down to the farmers as the price of agricultural products slowly rises and the demand for more products are required and value-added opportunities arise.

3. New opportunities for collaboration with industry in extension activities are being developed. These include: Input suppliers (seeds, fertilizer, animal/crop health products, farm equipment, etc.) include advice and training as part of marketing their products. Additionally, purchasers of agricultural products advise, train, and recommend techniques to ensure supplies of guaranteed quantity and quality. This leads to private trainer-advisor-outreach agencies emerging in response to the demand from public agencies and professional organizations. Farmer organizations (trade unions,

associations, cooperatives and others) may offer a range of service provisions such as inputs and product marketing, loan facilities, training, information, facilitation and extension services.

4. Public spending on extension is shrinking as policies to bring down public deficits in most developing countries have led to expenditure ceilings on agricultural extension and the introduction of fee-based schemes. In some ways, this is a positive development. Users can dictate, or at least influence, the type and quality of the services they buy. On the other hand, it may put some of these services beyond the reach of the poorest.

According to the Swiss Center for Agricultural Extension, a new approach to extension is needed to accommodate the developments and trends described. But it must emerge from an analysis of the successes and failures of existing operations. The reason is that the success of extension programs must be gauged over the long term. The main benchmarks must be their impacts on agricultural output, the welfare of rural communities and environmental sustainability, but consumers' interests must not be left out of the equation. It has proven difficult to assess these objectives in practice. While indicators for monitoring outreach activities are often available, final impacts are rarely assessed and are not strictly comparable between different types of interventions and contexts.

These constraints notwithstanding, the following six principles can be said to form the basis of an extension policy.

1. A sound agricultural policy is indispensable. An agricultural extension program is more likely to succeed if the conditions for growth in agriculture and related industries are in place. Extension is only one aspect of agricultural policy.

2. Extension consists of "facilitation" as much if not more than "technology transfer". Extension is too often merely seen as a vehicle for spreading scientific and technical progress and technology transfer. But this is a narrow and highly unsatisfactory definition.

The dissemination of knowledge is not a one-way street from scientists to producers. Farmers' own knowledge must be collected, analyzed, capitalized on, propagated and disseminated.

Producers need more than just technical information. There is rarely a "one size fits all" solution to address the mix of technical, economic, commercial, social and environmental aspects that farming problems consist of. Farmers need information on markets, credit facilities and consumer demand. But simply making information more readily available is not enough to ensure that it is used effectively. On the various levels of their activities (farm, local community, industry subsector), producers must themselves be able to analyze the constraints, seek out and test solutions, and make choices from an array of existing service providers.

Extension professionals must be adept in participatory techniques, and resourceful in drawing on a mix of communication methods and technologies. They must think in terms of market opportunities, increasing producer incomes and total farm management.

3. Ensure that all extension activities are supported for agricultural training, farmer organizations and agricultural research. Human and financial resources must be balanced among all the elements which help take agricultural knowledge forward: education, training, research, extension and professional organizations. Targeting all available resources on extension alone is not effective.

## **TECHNOLOGY TRANSFER**

Burton E. Swanson, Professor Emeritus of Rural Development University of Illinois at Urbana-Champaign examined the technology transfer function and concluded that this activity will become increasingly privatized as technologies become progressively more proprietary and as farmers become more commercialized. As this transition occurs, more and more of the cost of providing technical advisory services to farmers will be recovered through the sale of production inputs and services. However, in most developing countries, there can and should be closer cooperation between the public and private sectors because many input suppliers do not have technically competent sales personnel who can give correct technical advice to farmers. Therefore, rather than public extension personnel viewing the private sector as competitors, they should develop public-private partnerships with input supply dealers because these firms provide most of the one-on-one technical advisory services, especially to large commercial farmers and, to a lesser extent, to small-scale farmers unless they are organized into producer groups.

As an example of this concept I was involved in a research and extension project in collaboration with the private sector. The objective of which was to determine the effect on digestibility and production of protein and energy supplementation of stocker cattle on intensively-managed grass flood-meadow pastures.

In Utah retained ownership of calves beyond weaning is very low. This may be due to factors such as cash flow but also increased financial risk and the potential for negative or low value-added opportunities. Pastures could provide for increased value-added and retained ownership opportunities through stocker cattle (yearlings on grass) on irrigated and intensively-managed pastures.

Flood meadows are predominant in many of the valleys and normally constitute grasses and sedges with moderate energy levels and relatively low protein values. These pastures are typically allowed to grow to mid-season and then hayed and stock-piled for winter cow feed supplies. Grazing of flood meadow pastures by growing cattle is carried out but production is limited due to nutrient constraints (primarily protein) to maximize growth resulting in marginally competitive costs of gain. Intensive management (use of electric fence and grazing pressure) is now common among stocker operations utilizing tame grass pastures. This provides the opportunity to incorporate supplemental feeding strategies with a higher degree of control than was formerly possible when cattle were extensively grazed.

High protein products generally increase weight gains of cattle grazing moderate to low quality forage by increasing forage intake and digestibility. High bypass protein feeds such as corn gluten feed have been successfully used as a protein and energy supplement for growing beef cattle grazing forage in the summer. These high bypass products are particularly valuable where the forage is rapidly degraded such as lush grass or irrigated pastures.

Soy Best, an extruded soybean product, has 42 percent protein and 86 percent TDN with 60 percent of the protein as bypass or Under graded Intake Protein (UIP). By-pass is a term which implies that the protein within the feed is not degraded in the rumen but escapes this environment and is available for absorption in the small intestine. This can be advantageous, particularly if the protein in the feed is already of high quality.

We cooperated with a company that produced the Soy Best product and carried out the study. In the end we were able to determine that supplementation of protein does provide a production advantage but not necessarily an economic advantage. We developed an extension fact sheet and spoke at a number of producer meetings about protein supplementation.

### ***Examples of Extension Programs in the USA for Beef Cattle***

1. I have been involved in a number of successful extension programs in the USA and Canada as I have worked as an extension beef specialist. One of these programs we called Intermountain Beef 3910 which took participants through a number of learning exercises, which increased their knowledge in beef grading, price discovery and certain aspects of production, and animal husbandry. This two day workshop was developed in collaboration with industry partners including major sponsorship from the Utah Cattlemen's Association, Global Animal Management and Utah State University Extension. Logistical support was provided by JBS, in the form of facilities and personnel. Each workshop was limited to 20 participants and there have now been twelve workshops to date. The objectives of the workshop were to provide participants with a basic understanding of the beef grading system and Beef Quality Assurance (BQA) to demonstrate how these principles relate to them and the entire beef industry. This is a hands on program and extremely well received by beef producers, industry and university faculty. The reason for the success of the program has been because of the collaboration of all involved with a common objective and support from government, university, industry and the beef producers themselves.

2. Another example of extension programs in the area of beef cattle that has worked is illustrated below. Researchers in the western USA determined that supplementation of beef cattle on western ranges was necessary and would lead to increased productivity and financial gain.

Ruminants are often unable to consume enough nutrients from pasture forage to fulfill requirements. During such situations supplemental feeding is necessary to meet production goals. There are numerous commercial feed supplements available to producers, and an unlimited number of

options for the development of custom supplements. It may be difficult to decide which supplement type (i.e., energy, protein, etc.) best fits the goals of the livestock production system. A fundamental understanding of ruminant nutrition is helpful in making these decisions. It is also important to choose a delivery method that provides the targeted amount of desired nutrients to each animal in the herd and minimizes input costs.

Supplemental feeds for livestock are often classified as energy or protein supplements by considering the percentage protein alone. This is because the primary protein and energy feedstuffs used in supplements are generally between 75 and 90 percent TDN, yet the protein content of the high protein feedstuffs, like cottonseed meal or soybean meal, are three to five-fold higher than grains like corn and milo. Because of this relationship, the primary difference in nutrient content of a 20 percent and 40 percent protein supplement is the protein concentration, not energy. Thus, supplements are often categorized as protein or energy supplements based on the protein content alone.

Developing a cost-effective supplementation program is dependent upon identifying the nutrient most limiting to productivity and providing the limiting nutrient(s) at the lowest cost. If protein is deficient (i.e., < 7 percent crude protein), supplements should be evaluated based on cost per pound of protein. Similarly, if forage supply is limited and energy is deficient, supplements should be evaluated based on cost per pound of TDN (energy). Sometimes both energy and protein are limiting, so a balanced approach to provide supplemental protein and energy is recommended.

Generally, high protein feedstuffs are more expensive than grains or energy byproducts. Since high protein feedstuffs are more expensive per ton, high protein supplements are more expensive than low protein supplements. However, it is critically important to evaluate potential supplements based on cost per unit of nutrient needed.

A fact sheet was developed with the objective to aid producers in determining the supplement type needed for grazing beef cattle and to describe the characteristics of supplement delivery methods. The format of the fact sheet was to explain supplemental feeding and provide research findings to validate the reasons for supplementation.

1. In one area of Utah we were interested in developing a mineral nutrition program with ranchers. Beef cattle require a number of dietary mineral elements for normal bodily maintenance, growth, and reproduction. Minerals that are required in relatively large amounts are called major or macro elements. Those needed in small amounts are classified as micro, minor, or trace minerals. The major minerals include calcium, phosphorus, magnesium, potassium, sodium, chlorine and sulfur. Among those needed in trace amounts are iron, zinc, manganese, copper, iodine, cobalt and selenium.

Samples were taken from feed supplies and pasture over a period of 6 months on each ranch that cooperated. Nutrient analysis determined the levels of each mineral using mass spectroscopy. Results were tabulated and developed into a fact sheet. Additionally we held a series of producer meetings to explain the results.

2. The final example is "The Cow-Calf Management Guide & Cattle Producer's Library" which is an educational resource for cattle producers and educators prepared by the Western Beef Resource Committee. The committee consists of extension specialists in 12 western states. Historically, the Library has only been distributed in printed form. In 1999 a CD-ROM version was added. The Library contains approximately 250 factsheets in sections on quality assurance, nutrition, reproduction, range and pasture, animal health, management, marketing, finance, genetics, and drought and other natural disasters. The Library is revised annually by WBRC.

The Library has been a tremendous resource for beef cattle producers throughout the USA. Thousands of the books and CDs have been distributed over the past 20 years.

Presently I am involved in a project to develop something of a similar nature for third world countries but in areas such as animal husbandry, human nutrition, water development, irrigation, agronomics and other areas related to rural living and agriculture. I am working with private industry on this venture which will include visits and training to a number of countries, the first of which are Peru and Ecuador next spring. The fact sheets and resources produced will be tailored for any type of situation such as tropical, arid, semi-arid etc.

## CONCLUSIONS

Any one of the examples used in this paper could be implemented in Indonesia in any area of agriculture. The point is, information needs to be developed based on sound principles and practices which are formulated from available research or knowledge. From here extension programs, fact sheets or other resources can be developed in cooperation with industry, government, agricultural producers etc. There is no end to the opportunities and resources available if everyone works together for the greater good.

Agricultural extension systems, especially in developing countries such as Indonesia, are in a process of change as the national focus shifts from national food security to improving rural livelihoods, including food security at the household level and, increasingly, working to achieve sustainable natural resource management. At the same time, while the world's supply of staple food crops will continue to increase, the increasing demand among many industrialized nations for biofuels is rapidly increasing worldwide prices for many staple food crops. The immediate and long-term impact on food consumption and human nutrition among the poor and ultra-poor is uncertain but appears to be serious. The impact on small-scale farmers will likely differ from country to country, depending on government price, import and export policies and what it will do to enhance their ability to seize opportunities offered by the market (Swanson).

## LITERATURE CITED

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